AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 | 1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0006	26-Jan-2005		102716

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
CONTRACTING DIVISION USACE, LITTLE ROCK (W9127S) 700 W. CAPITOL AVE, RM 7018 LITTLE ROCK AR 72201-3225	W9127S	**See Item 6**	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. W9127S-05-B-0004
	X	9B. DATED (SEE ITEM 11) 30-Nov-2004
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

REPLACE VALVE AND OPERATING MECHANISM FOR TAILRACE DRAIN SYSTEM, DARDANELLE POWERHOUSE, YELL COUNTY, ARKANSAS

A. Specification Changes - Replace SECTION 15200 with revised SECTION 15200, Encl 1.

B. Bid opening date and time remain UNCHANGED (02 Feb 2005, 2:00 p.m.).

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 26-Jan-2005

SECTION 15200

PIPELINES, LIQUID PROCESS PIPING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(1997a) Carbon Structural Steel
ASTM A 126	(1995) Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A 167	(1996) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
ASTM A 182/A 182M	(1997c) Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
ASTM A 193/A 193M	(1998) Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194/A 194M	(1998) Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service
ASTM A 268	(1996) Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service
ASTM A 312/A 312M	(1995a) Seamless and Welded Austenitic Stainless Steel Pipes
ASTM A 351/A 351M	(1994a) Castings, Austenitic, Austenitic-Ferric (Duplex), for Pressure-Containing Parts
ASTM A 395	(1988; R 1998) Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
ASTM A 403/A 403M	(1998) Wrought Austenitic Stainless Steel Piping Fittings

ASTM A 513	(1997) Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM A 576	(1990b; R 1995) Steel Bars, Carbon, Hot-Wrought, Special Quality
ASTM A 813/A 813M	(1995) Single- or Double-Welded Austenitic Stainless Steel Pipe
ASTM A 815/A 815M	(1998) Wrought Ferritic, Ferritic/Austenitic, and Martensitic Stainless Steel Piping Fittings
ASTM A 858/A 858M	(1996) Heat-Treated Carbon Steel Fittings for Low-Temperature and Corrosive Service
ASTM A 865	(1997) Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints

ASME INTERNATIONAL (ASME)

ASME B1.20.1	(1983; R 1992) Pipe Threads, General Purpose (Inch)
ASME B16.1	(1989) Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.5	(1996; B16a) Pipe Flanges and Flanged Fittings NPS 1/2 thru NPS 24
ASME B16.9	(1993) Factory-Made Wrought Steel Buttwelding Fittings
ASME B16.11	(1996) Forged Fittings, Socket-Welding and Threaded
ASME B16.21	(1992) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.28	(1994) Wrought Steel Buttwelding Short Radius Elbows and Returns
ASME B31.1	(1998) Power Piping
ASME B31.3	(1999) Process Piping
ASME B36.19M	(19685; R 1994) Stainless Steel Pipe
ASME B40.1	(1991) Gauges - Pressure Indicating Dial Type - Elastic Element

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service
AWWA C508	(1993; C508a) Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS
AWWA C509	(1994) Resilient-Seated Gate Valves for Water Supply Service
AWWA C550	(1990) Protective Epoxy Interior Coatings for Valves and Hydrants
AWWA C606	(1997) Grooved and Shouldered Joints

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-25	(1998) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-58	(1993) Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	(1996) Pipe Hangers and Supports - Selection and Application
MSS SP-89	(1998) Pipe Hangers and Supports - Fabrication and Installation Practices

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(1991) Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 49	(1994) Hazardous Chemical Data
NFPA 325-1	(1994) Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids

NFPA 704 (1996) Identification of the Fire Hazards of Materials for Emergency Response

1.2 SYSTEM DESCRIPTION

This specification covers the requirements for above grade liquid process pipe, pipe supports, fittings, equipment and accessories located both inside and outside of treatment plants.

1.2.1 Design Requirements

Support systems shall be selected and designed within the specified spans and component requirements. The absence of pipe supports and details on the contract drawings does not relieve the Contractor of responsibility for sizing and providing supports.

1.2.2 Performance Requirements

The pressure ratings and materials specified represent minimum acceptable standards for piping systems. The piping systems shall be suitable for the services specified and intended. Each piping system shall be coordinated to function as a unit. Flanges, valves, fittings and appurtenances shall have a pressure rating no less than that required for the system in which they are installed.

1.2.2.1 Above Grade Piping Systems

Piping systems shall be suitable for design conditions, considering the piping both with and without internal pressure, and installation factors such as support spans and ambient temperatures. Consideration shall be given to all operating and service conditions both internal and external to the piping systems.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings
Pipe and Equipment; G,

Equipment shop drawings and support system detail drawings showing piping systems and appurtenances, such as mechanical joints, valves, local indicators and hangers, including a complete list of equipment and materials. As-built drawings showing pipe anchors and guides, and layout of piping systems relative to other parts of the work including clearances for maintenance and operation. As-built piping and instrumentation diagrams (P&IDs) identifying and labeling equipment, instrumentation, valves, drains, and all other inline devices; if the contract drawings contained P&IDs, the P&IDs found in the contract drawings shall be revised to reflect the constructed process system, as directed by the Contracting Officer.

SD-03 Product Data

Qualifications;

A statement certifying that the Contractor has the specified experience.

Welders;

The names of all qualified welders, their identifying symbols, and the qualifying procedures for each welder including support data such as test procedures used, standards tested to, etc.

Assistance and Training;

A signed statement certifying that the installation is satisfactory and in accordance with the contract drawings and specifications and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

Delivery, Storage and Handling;

Material safety data sheets;

Materials and Equipment;

Manufacturer's descriptive and technical literature for each piping system, including design recommendations; pressure and temperature ratings; dimensions, type, grade and strength of pipe and fittings; thermal characteristics (coefficient of expansion and thermal conductivity); and chemical resistance to each chemical and chemical mixture in the liquid stream.

Installation;

The manufacturer's installation recommendations or instructions for each material or procedure to be utilized, including materials preparation.

Pipe Schedule;

A list of piping systems, pressure ratings and source of supply for each piping system broken out by material, size and application as indicated on the contract drawings. A list of any special tools necessary for each piping system and appurtenances furnished for adjustment, operation, maintenance and disassembly of the system.

Valve and Operator Schedule; G

A list of valve materials, pressure ratings, valve operator's materials, air supply pressure, electrical service, location, source of supply, and reference identification as indicated in the contract drawings. A list of any special tools necessary for each valve type and appurtenances furnished for adjustment, operation, maintenance and disassembly.

SD-06 Test Reports

Pipe Leakage Tests; Hydrostatic Tests; Valve Testing;

Copies of all field test reports within 24 hours of the completion of the test.

SD-10 Operation and Maintenance Data
Piping, Valves, and Appurtenances;

Six copies each of operation and maintenance manuals in indexed booklet form. Operation manuals shall detail the step-by-step procedures required for specialized startup, operation and shutdown of piping systems, and shall include the manufacturer's name, model number, parts list and brief description of piping equipment such as valves and other appurtenances and their basic operating features. Maintenance manuals shall list routine maintenance procedures and troubleshooting guides for the equipment, and shall include piping layout and valve locations.

1.4 QUALIFICATIONS

1.4.1 Contractor

Contractor shall have successfully completed at least 3 projects of the same scope and size or larger within the last 6 years. Contractor shall demonstrate specific experience in regard to the system installation to be performed.

1.4.2 Welders

The welding of pressure piping systems shall be in accordance with qualifying procedures using performance qualified welders and operators. Procedures and welders shall be qualified in accordance with Section 05093 WELDING PRESSURE PIPING.

1.5 GENERAL JOB REQUIREMENTS

Piping materials and appurtenances shall be as specified and as shown on the drawings, and shall be suitable for the service intended. Piping materials, appurtenances and equipment supplied as part of this contract shall be new and unused except for testing equipment. Components that serve the same function and are the same size shall be identical products of the same manufacturer. The general materials to be used for the piping systems are indicated by service in the contract drawings.

1.5.1 Components

Piping equipment and appurtenances shall be new products of equal material and ratings as the connecting pipe.

1.5.2 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacturing of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Nominal sizes for standardized products shall be used. Pipe, valves, fittings and

appurtenances shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

1.5.3 Identification

Each piece of pipe shall bear the ASTM designation and all other markings required for that designation. Valves shall bear a securely attached tag with the manufacturer's name, valve model number, and valve identification permanently displayed and be marked in accordance with MSS SP-25.

1.6 DELIVERY, STORAGE AND HANDLING

Materials delivered and placed in storage shall be stored with protection from the weather, excessive humidity variation, excessive temperature variation, dirt, dust and/or other contaminants. Proper protection and care of material before, during and after installation is the Contractor's responsibility. Any material found to be damaged shall be replaced at the Contractor's expense. During installation, piping shall be capped to keep out dirt and other foreign matter. A material safety data sheet in conformance with 29 CFR 1910 Section 1200(g) shall accompany each chemical delivered for use in pipe installation. At a minimum, this includes all solvents, solvent cements, glues and other materials that may contain hazardous compounds. Handling shall be in accordance with ASTM F 402. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1. Materials shall be stored with protection from puncture, dirt, grease, moisture, mechanical abrasions, excessive heat, ultraviolet (UV) radiation damage, or other damage. Pipe and fittings shall be handled and stored in accordance with the manufacturer's recommendation.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Environmental Requirements

Piping system design, supply and installation shall address the external corrosion conditions so indicated.

1.7.2 Existing Conditions

The Contractor shall be responsible for the verification of existing piping and penetrations. Prior to ordering materials, the Contractor shall verify the size, material, joint types, elevation, horizontal location, and pipe service of existing pipes, and inspect size and location of structure penetrations to verify adequacy of wall sleeves, and other openings before installing connecting pipes.

1.7.3 Verification of Dimensions

After becoming familiar with all details of the work, the Contractor shall verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.8 MAINTENANCE

1.8.1 Service

Services for valve systems shall be provided by a manufacturer's representative who is experienced in the installation, adjustment and operation of the equipment specified. The representative shall inspect the installation, and supervise the adjustment and testing of the equipment.

1.8.2 Extra Materials

Concurrent with delivery and installation of the specified piping systems and appurtenances, spare parts for each different item of material and equipment specified that is recommended by the manufacturer to be replaced any time up to 3 years of service shall be furnished. For each type and size of valve, the following extra materials shall be provided: lubricator, lubricant (with appropriate temperature rating), lubricator/isolating valve; galvanized operating wrench, 4.1 feet long, for T-handled operators. Extra materials shall include 2 of the following spare parts for each type and size of valve: gaskets; O-ring seals; all elastomer parts; and stem packing.

PART 2 PRODUCTS

2.1 CARBON STEEL PIPING SYSTEM

2.1.1 Carbon Steel Pipe

2.1.1.1 General Service

Unless specified otherwise, carbon steel pipe shall meet the requirements of ASTM A 53 seamless, Grade A or API Spec 5L, Schedule 40.

2.1.2 Carbon Steel Joints

Carbon steel piping shall be joined by welding fittings or flanges meeting the requirements of AWWA C606. Dielectric fittings or isolation joints shall be provided between all dissimilar metals.

2.1.3 Carbon Steel Fittings

Fittings shall be cast malleable iron or carbon steel. Where cast fittings are not available, segmental welded steel fittings, ASTM A 53, Grade B, meeting the requirements of manufacturer's recommended wall thickness shall be fabricated.

2.1.3.1 Threaded Fittings

Amend 0003

Threaded fittings are not called for on this project.

2.1.3.2 Welding Fittings

Welding fittings shall be butt-welding or socket-welding. Welding fittings shall be forged steel, ASTM A 105/A 105M Class 150 conforming to ASME B16.9 and ASME B16.28, or ASME B16.11.

2.1.3.3 Flanged Fittings

The internal diameter bores of flanges and flanged fittings shall be the same as that of the associated pipe. The flanges shall be welding neck, socket welding, or lapped type. Flanges and flanged fittings shall be forged steel, ASTM A 105/A 105M, faced and drilled to ASME B16.5 Class 150 with a 0.0625 inch raised face. For tie-in to existing flanges, the Contractor shall field check existing flanges for non-standard bolt hole configurations and shall design as required to assure new pipe and flange mate properly. Bolting shall be alloy-steel ASTM A 193/A 193M Grade B5 or B7 hex head bolts and ASTM A 194/A 194M Grade 3 or 8N hex head nuts. When mating flange on valves or equipment is cast iron, ASTM A 193/A 193M Grade B8 Class 1 bolts and ASTM A 194/A 194M Grade 8 heavy hex head nuts shall be used. Bolts shall be provided with washers of the same material as the bolts. Gaskets shall meet the requirements of ASME B16.5. Nonmetallic gaskets shall conform to ASME B16.21 and be a maximum 0.125 in. thick chloroprene rubber, durometer hardness No.80, 1,500-psi minimum tensile strength, 125 percent minimum elongation, flat ring type for use with raised face flanges.

2.4 VALVES

2.4.1 Requirements For Valves

Valves shall include electric operator and controls, actuator, handwheel, floor stand, worm and gear operator, operating nut, stem and stem guides, wrench, and all other accessories required for a complete operation. The valves shall be suitable for the intended service. Renewable parts are not to be of a lower quality than those specified. Valves shall be the same size as adjoining pipe. Valve ends shall be compatible with adjacent piping system. An operator shall be sized to operate the associated valve for the full range of pressures and velocities. Valves will open by turning counterclockwise. Operators, actuators, and accessories shall be factory mounted.

2.4.2 Valve Schedule

Requirements relative to this paragraph are shown on the contract drawings.

2.4.3 Factory Finishing

Valves shall have an epoxy lining and coating in accordance with AWWA C550 unless otherwise specified. The epoxy shall be either a two-part liquid material or a heat-activated (fusion) material except that only a heat-activated material shall apply if a valve coating is specified as "fusion" or "fusion bonded" epoxy. The epoxy lining and coating shall have a minimum (7.0 mils) dry film thickness except where it is limited by valve operating tolerances. Exposed valves shall be finished in accordance with Section 65 PAINTING, GENERAL.

2.4.4 Knife Gate Valves

Amend 0003

2.4.4.1 General Service Knife Gate Valves

General service gate valves shall conform to the following:

Knife gate valves shall have stainless steel bodies with Ni-resistant stainless steel trim or carbon steel bodies. Valves shall meet the requirements of AWWA C500 or AWWA C509 and have Class 150 flanged end connections. Bonnet shall be a NRS Bolted type. Discs shall be knife type of stainless steel construction, and have rising stems. Valves shall be rated for 100-psig service. Valves shall be equipped with handwheel or electrically actuated operators with manual override handwheel.

2.4.5 Operators

2.4.5.1 Operator Schedule

Requirements relative to this paragraph are shown on the contract drawings.

2.4.5.2 Manual Operator

Amend 0006

All operators are to be electric with manual override. Specification for the manual override operators is provided in paragraph 2.4.5.3.

2.4.5.3 Electric Operator

Electric operators shall be provided complete with actuators, local push button station, three buttons (OPEN STOP CLOSE) two lights (GREEN for local and RED for Remote) and three-position selector switch (LOCAL OFF REMOTE), local position indicator potentiometer and accessories. The actuators shall operate on 460 VAC,3PH with a 75 percent duty cycle and shall be equipped with an AC thermal overload protector with automatic rest, reversing (bi-directional) operation for use with quarter-turn valves, or rotating equipment to full rotation. Gearing shall be a two-stage planetary, permanently lubricated self-locking gear train with self-lubricating bearings; connections via male output staff. The start-up torque shall be 120 foot-pound. The stall torque shall be 150 foot-pound. Two travel stop limit switches with cams, internal, independent, adjustable, and actuated by cams shall be mounted on the drive shaft. A side mounted hand turn wheel shall be provided for a manual override. The force in the manual operator shall not exceed 39.3 pound under any operating condition, including initial breakaway. The manual operator shall be a self-locking type or shall be equipped with a self-locking device. The actuators shall have a NEMA 250 Type 4 enclosure with a corrosion resistant, baked epoxy finish as standard. The actuator shall operate in a temperature range of -40 to 150 degrees F. Actuators shall fail in last position unless otherwise indicated. Electric operators shall be furnished with features noted. Limit switches shall be provided on all actuators. Electric valve operator shall be Limitorque model L120 or approved equal. In addition, operator shall be provided with mounting adaptation to fit existing floor mount manufactured by Crane.

Exposed Operators. Exposed operators shall have galvanized and painted handwheels. Wheels shall be lockable with a chain and padlock.

a. Limit Switches. Limit switches shall be single-pole, double-throw (SPDT) type, rated 10 amps at 120 volts ac, housed in a NEMA 250 Type 4 enclosure, and adjustable for open and closed valve positions.

b. Positioners. The positioners for modulating actuators shall control valve positions as a function of the input signals. Position indicator shall be a potentiometer. Corrosion-resistant enclosures for positioners shall be splash-and moisture-proof with gasketed covers.

2.4.6 Valve Accessories

2.4.6.1 Tagging

Identification tags made of stamped stainless steel indicating service and valve number shown on the contract drawings shall be installed on valves using No. 12 AWG copper wire, stainless steel wire, or chrome-plated beaded chain. Tags shall be 1.375-inch minimum diameter. Indentations shall be black for reading clarity.

2.5 MISCELLANEOUS PIPING COMPONENTS

2.5.1 Indicating Devices

2.5.1 Expansion Joints

The Contractor shall provide all structural work and equipment required to control expansion and contraction of piping. The Contractor shall verify that the anchors, guides, and expansion joints provided, adequately protect the piping systems.

2.5.1.1 Expansion Joint for Metallic Pipe

The expansion joint shall be a single slip type with stainless steel wetted materials of construction. The expansion joint shall be sized to match the associated piping. The maximum allowable working pressure shall be 150 psig at 120 degrees F. The expansion joint shall be sized for a maximum axial compressing deflection of 3 inches, a lateral movement of 0.5 inches and an angular rotation of 15 degrees. End connections shall be as specified for the associated pipe joints. Required accessories for a complete assembly shall be provided.

2.6 PIPE SUPPORTS AND PENETRATIONS

Auxiliary steel shall be provided by the Contractor where the support of piping systems and equipment is required between building structural elements. Light gauge and structural steel shapes shall conform to the requirements of ASTM A 36/A 36M. The Contractor shall have the option to use pre-engineered support systems of stainless steel products. However, a mixture of support system manufacturers products is not permitted.

2.6.1 Pipe Supports

Pipe supports shall conform to the requirements of MSS SP-58, MSS SP-69, and MSS SP-89. Where pipe supports contact bare piping or in-line devices, provide supports of compatible material so that neither shall have a deteriorating action on the other.

2.6.1.1 Brackets

Where piping is run adjacent to walls or steel columns, the Contractor shall provide welded brackets, pre-punched with a minimum of two fastener holes.

2.6.1.2 Offset Pipe Clamp

Where pipes are indicated as offset from wall surfaces, a double-leg design two-piece pipe clamp shall be supplied by the Contractor.

2.6.2 Pipe Guides

For piping, alignment guides shall be galvanized steel or stainless steel, roller type guides.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

Pipe and equipment openings shall be closed with caps or plugs during installation. Equipment shall be protected from dirt, water, and chemical or mechanical damage.

3.1.2 System Preparation

3.1.2.1 Pipe and Fittings

Pipe and fittings shall be inspected before exposed piping is installed. The Contractor shall clean the ends of pipes thoroughly, remove foreign matter and dirt from inside of pipes, and keep piping clean during and after laying.

3.1.2.2 Damaged Coatings

The Contractor shall repair damaged coating areas in the field with material equal to the original coating. The Contractor shall not install damaged piping materials.

3.1.2.3 Field Fabrication

The Contractor shall notify the Contracting Officer at least 2 weeks prior to the field fabrication of pipe or fittings and at least 3 days prior to the start of any surface preparation or coating application work. Field welding shall be performed in accordance with Section 05093 WELDING PRESSURE PIPING. Welding electrodes shall be provided in accordance with Table 4.1 of AWS D1.1 as required for the applicable base metals and welding process. Fabrication of fittings shall be performed in accordance with the manufacturer's instructions.

3.2 EXPOSED PIPING INSTALLATION

Exposed piping shall be run as straight as practical along the alignment shown on the contract drawings and with a minimum of joints. Piping and appurtenances shall be installed in conformance with reviewed shop drawings, manufacturer's instructions and ASME B31.3. Piping shall be installed without springing or forcing the pipe.

3.2.1 Anchors and Fasteners

Impact expansion (hammer and explosive charge drive-type) anchors and fastener systems are not acceptable. Lead shields, plastic or fiber inserts, and drilled-in plastic sleeve/nail drive systems are also not acceptable.

3.2.1.1 Drilled-In Expansion Anchors and Fasteners

Anchors shall be designed to accept both machine bolts and/or threaded rods. Such anchors shall consist of an expansion shield and expander nut contained inside the shield. The expander nut shall be fabricated and designed to climb the bolt or rod thread and simultaneously expand the shield as soon as the threaded item, while being tightened, reaches, and bears against the shield bottom. The shield body shall consist of four legs; the inside of each shall be tapered toward shield bottom (or nut end). The end of one leg shall be elongated and turned across shield bottom. The outer surface of shield body shall be ribbed for grip-action. The expander nut shall be of square design with sides tapered inward from bottom to top. The anchor materials of construction shall be TP304 stainless steel of 43,541-psi minimum tensile strength. Fasteners shall be machine bolts for use with above anchors; nuts and washers shall conform to ASTM A 194/A 194M. The anchor length, diameter, and embedment depth shall meet the manufacturer's requirements for the maximum allowable working load of the application. The anchor/fastener assembly shall be UL listed with a one-piece stud (bolt) that has integral expansion wedges, nuts and washers. The stud shall be constructed of TP304 stainless steel, and nut and washer of TP304 stainless steel. The anchor length, diameter, and embedment depth shall meet the manufacturer's requirements for the maximum allowable working load of the application.

3.2.2 Piping Expansion Provisions

The piping shall be installed to allow for thermal expansion resulting from the difference between installations and operating temperatures. Anchors shall be installed as shown in the contract drawings to withstand expansion thrust loads and to direct and control thermal expansion. An intermediate pipe guide shall be installed for every pipe at each metal channel framing support not carrying an anchor or alignment guide. Where pipe expansion joints are required, pipe alignment guides shall be installed adjacent to the expansion device and within four pipe diameters. Expansion devices shall be installed in accordance with the manufacturer's instructions and at the locations shown in the contract drawings.

3.2.3 Piping Flexibility Provisions

Flexible couplings and expansion joints shall be installed at connections to equipment, and where shown on the contract drawings. Additional pipe anchors and flexible couplings beyond those shown on the contract drawings shall be provided to facilitate piping installation, in accordance with reviewed shop drawings.

3.2.4 Couplings, Adapters and Service Saddles

Pipes shall be thoroughly cleaned of oil, scale, rust, and dirt in order to provide a clean seat for gaskets. Gaskets shall be wiped clean prior to installation. Flexible couplings and flanged coupling adapter gaskets shall be lubricated with the manufacturer's standard lubricant before installation on the pipe ends. Couplings, service saddles, and anchor studs shall be installed in accordance with manufacturer's instructions. Bolts shall be tightened progressively, drawing up bolts on opposite sides a little at a time until all bolts have a uniform tightness. Torque-limiting wrenches shall be used to tighten bolts.

3.2.5 Piping Equipment/Component Installation

Piping components and indicators shall be installed in accordance with manufacturer's instructions. Required upstream and downstream clearances, isolation valves, and miscellaneous devices shall be provided for an operable installation.

3.2.5.1 Local Indicators

All direct-reading indicator devices and pressure gauges shall be installed so that they can be easily read from floor level, and are readily accessible for maintenance and service. Pressure gauges shall be installed where indicated in the contract drawings. Field calibration of all indicators shall be performed at time of installation to ensure measuring and reading accuracy.

3.2.6 Pipe Flanges

Pipe flanges shall be set level, plumb, and aligned. Flanged fittings shall be installed true and perpendicular to the axis of the pipe. The bolt holes shall be concentric to the centerline of the pipe and shall straddle the vertical centerline of the pipe.

3.2.7 Valve Locations

Valves shall be located in accordance with the contract drawings where actuators are shown.

3.2.8 Pipe Tap Connections

Taps to pipe barrels are unacceptable. Taps to steel piping shall be made only with a welded threadolet connection.

3.3 EXTERNAL CORROSION PROTECTION

Protect all pipe and piping accessories from corrosion and adverse environmental conditions.

3.3.1. Ferrous Piping

Shop primed surfaces shall be touched up with ferrous metal primer. Surfaces that have not been shop primed shall be solvent cleaned. Surfaces that contain loose rust, mill scale or other foreign substances shall be mechanically cleaned by power wire brushing and primed with a ferrous metal primer. Primed surfaces shall be finished in accordance with Section 09965 PAINTING, HYDRAULIC STRUCTURES.

3.5 FLEXIBLE JOINTS AT CONCRETE STRUCTURES

Flexible joints shall be provided at the face of all structures, whether or not shown on the contract drawings. Mechanical joints, flexible couplings, and proprietary restrained ductile iron pipe joints shall be considered flexible joints; welded pipe joints shall not. Joints may be flush with the structure face or may be located up to 1 pipe diameter away from face, but not further than 17.7 inches away from face.

3.6 CLOSURES

Closure pieces shall be installed as necessary to end pipe runs and shall conform to ASME B16.9 or ASME B16.11. Elastomer sleeves bonded to pipe ends are not acceptable. Pressure piping shall have closures of blind flanges or plain end pieces, with thickness matching the nominal wall thickness of the associated pipe, mounted on double flexible couplings, unless otherwise shown on contract drawings or approved by the Contracting Officer.

3.7 VALVE INSTALLATION

Flanged valve bolt holes shall be installed so as to straddle the vertical centerline of pipe. Flanged faces shall be cleaned prior to inserting the gasket and bolts, and then the nuts shall be tightened progressively and uniformly.

3.7.1 Valve Orientation

The operating stem of a manual valve shall be installed in a vertical position.

3.8 PIPING SUPPORT SYSTEMS INSTALLATION

The absence of pipe supports and details on the contract drawings shall not relieve the Contractor of responsibility for sizing and providing supports.

3.8.1 General Support Requirements

Pipe support systems shall meet the requirements of MSS SP-58. Contractor-designed and selected support systems shall be installed in accordance with MSS SP-69, and as specified herein. Piping connections to equipment shall be supported by pipe supports and not off the equipment. Large or heavy valves, fittings, and/or equipment shall be supported independently of associated piping. Pipes shall not be supported off other pipes. Supports shall be provided at piping changes in direction or in elevation, adjacent to flexible

joints and couplings, and where otherwise shown on the contract drawings. Pipe supports and hangers shall not be installed in equipment access areas. Existing support systems may be used to support additional new piping only if the Contractor can demonstrate that the existing support systems are adequate for the additional loads, or if the existing systems are strengthened to support the additional loads. Pedestal type pipe supports shall be provided under base flanges adjacent to rotating equipment and where required to isolate vibration. Lateral supports shall be installed at all changes in direction.

3.8.2 Support Methods

Piping support shall be provided as specified and as shown in the contract drawings. Vertical piping shall be supported by wall brackets, base elbows, or riser clamps on floor penetrations.

3.9 FIELD QUALITY CONTROL

3.9.1 Pipe Leakage Tests

Unless approved by the Contracting Officer, leakage testing shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and during the test the piping shall be subjected to not less than 100 psig pressure. Leakage is defined as the quantity of the test liquid, water, that is supplied to the piping system, or any valved or approved section thereof, in order to maintain pressure within 5 psi of the specified leakage test pressure after the piping has been filled with the test liquid and all air is expelled. No piping installation will be accepted if leakage exceeds the allowable leakage determined by the following formula:

$$L = Cf \times N \times D \times P^{0.5}$$

Cf = conversion factor = 0.0001351
L = allowable leakage, gallons per hour
N = number of joints in the length of piping tested
D = nominal pipe diameter, inches
P = average test pressure during the test, psig.

Should any test disclose leakage greater than that allowed, the leaks shall be located and repaired until the leakage is within the specified allowance, without additional cost.

3.9.2 Testing New to Existing Connections

New piping connected to existing pipe and existing equipment shall be tested. The Contractor shall isolate the new piping with pipe caps, spectacle blinds, or blind flanges. The joint between new piping and existing piping shall be tested by methods that do not place the entire existing system under the test load. The Contractor shall then proceed with the testing of new piping systems as specified herein.

3.9.3 Valve Testing

Valves may either be tested while testing pipelines, or as a separate step. It shall be demonstrated that valves open and close smoothly

with operating pressure on one side and atmospheric pressure on the other, and in both directions for two-way valve applications. The Contractor shall count and record the number of turns required to open and close each valve, and account for any discrepancies with manufacturer's data.

3.10 FINAL CLEANING

3.10.1 Interim Cleaning

The Contractor shall prevent the accumulation of weld rod, weld spatter, pipe cuttings and filings, gravel, cleaning rags, and other foreign material within piping sections during fabrication. The piping shall be examined to assure removal of these and other foreign objects prior to assembly and installation.

-- End of Section --